

UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA Session: 2021-22			
Discipline: Metallurgical Engineering	Semester: 5th	Name of the Teaching Faculty: Goutam Kumar Majhi	
Subject: Ferrous Metallurgy-II (TH-04)	No. of days/per week class allotted: 4	Semester from Date: 1. 10. 2021 to Date: 8.1.2022 No. of weeks: 15	
Week	Class Day	Module	Lecture Topics
1	1	Chapter -1: Steel Making Processes	Introduction about steel making
	2		Brief history of principles of steel making & processes of steel making
	3		Bistre steel making & Shear steel making
	4		Crucible steel making
2	5	Chapter -2 Principles of steel making	Bessemer steel making.
	6		Open hearth steel making
	7		Reactions involved in steel making
	8		acid process & basic process of steel making
3	9	Chapter-3: Raw Materials for Steel Making	principles and conditions required in removal of P, S, Si, Mn and C in steel making
	10		-do-
	11		-do-
	12		Raw materials required for steel making
4	13	Chapter-4: Steel Making by LD Converter	-do-
	14		important raw materials available in India
	15		different raw materials of LD process
	16		construction and operation of LD converter
	17		-do-
	18		Refining reaction in LD converter with reference to decarburization and dephosphorisation.
	19		-do-
	20		-do-

6	21		Quality of steel and composition of slag in LD process
	22		advantages and limitations of LD process
	23		Bottom, top and combined blowing
	24		Multi nozzle converter
7	25	Chapter-5: Blast furnace Operation	OLP process
	26		Tutorial Class
	27		Principle of electric arc furnace
	28		Types of slags prepared by electric arc furnace
8	29		steps of electric arc furnace heating to produce steel
	30		advantages of electric arc furnace process
	31		steel making induction furnace
	32		advantages and limitations of induction furnace process
9	33	Chapter-6: Brief Study of Other Recent Processes of Steel Making	Ajax Process
	34		OBM Process
	35		-do-
	36		Spray Steel Making Process
10	37	Chapter-7: De-Oxidation Practice	Different De-Oxidisers and their use
	38		killed steel, semi killed steel and rimming steel
	39		-do-
	40		Teeming methods
11	41	Chapter-8: Pit Side Practice	Direct pouring, Tundish teeming and Bottom teeming
	42		-do-
	43		Ingot defects, their causes and remedies
	44		-do-
12	45	Chapter- 9: Continuous Casting of Steel	Principle and operation of continuous casting
	46		-do-
	47		Different types of casters
	48		-do-
13	49		Moulds and mould maintenance in continuous casting.
	50		Advantages of continuous casting
	51		Continuous casting of Billets, Blooms and Slabs.
	52	Chapter- 10: Secondary Steel Making Processes	Importance of Secondary Steel Making

14	53		VAD Process
	54		VOD Process
	55		AOD Process
	56		-do-
15	57		Stream degassing process.
	58		Revision Class-I
	59		Revision Class-II
	60		Important question discussion

Learning Resources:

Sl.No	Title of the Book	Name of Authors	Name of Publisher
1.	. Steel Making	R.H.Tupkary	Khanna
2.	. Steel Making	A.K.biswas	Cootha
3.	Manufacture of iron & Steel Vol II	Bashforth	Chapman and Hall
4.	Elementary Metallurgy (Steel)	Frier	Mc Graw Hill
5.	Metal Process engineering	P.Polukrint	University Press of the Pacific
6.	Chemistry of Steel	Bodsworth	CBS
7.	Steel Making	V. A. Kudrin	VRSS Publishing Group